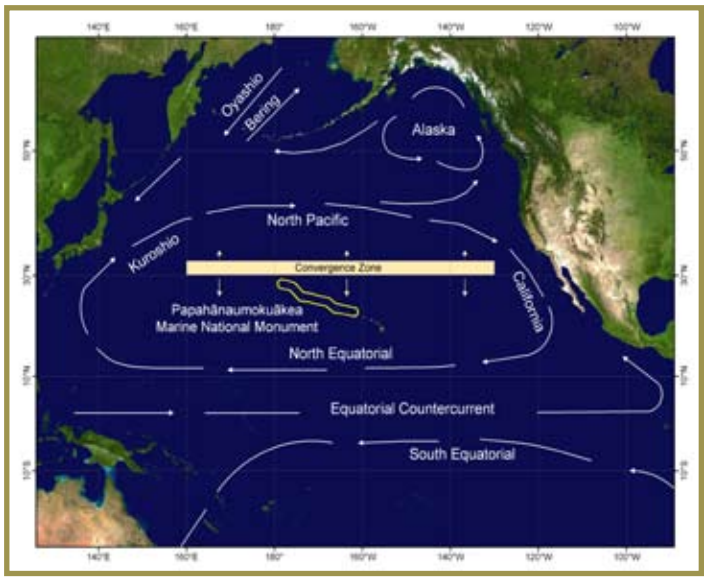
MARINE DEBRIS PROGRAM

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

PACIFIC

Focusing Efforts to Detect Derelict Fishing Gear at Sea in the North Pacific

Derelict fishing gear (DFG) is a chronic threat to the coral reef ecosystems of the Papahanaumokuakea Marine National Monument (Monument) located in the Northwestern Hawaiian Islands (NWHI). DFG entrained in currents of the North Pacific Subtropical Convergence Zone is strained out by the reefs and shoals of the Monument causing physical damage to the reef and endangering wildlife. DFG has been the target of intensive removal efforts since 1996, but additional efforts are needed to keep pace with deposition rates as well as to remove it before it has a chance to impact the Monument. Developing the technologies to detect and remove DFG at sea will help offset this imbalance and provide additional protection to Monument resources.



The North Pacific Subtropical Convergence Zone (CZ), an area where marine debris is known to accumulate, shifts seasonally between 23º N and 37º N latitude. When the CZ dips southward, marine debris is strained out by the shallows of the Papahanaumokuakea Marine National Monument. *Map courtesy of NOAA; data sources: NOAA and ESRI Data & Maps (2004).*

Our ability to predict areas of high marine debris concentration is limited. A summit of NOAA, other federal agency, and private sector experts in marine debris, oceanography, biology, remote sensing, and unmanned aircraft systems (UAS) will be held to produce a series of outputs that will move NOAA closer to an operational mode of at-sea detection and removal of marine debris. In addition, nearshore flights of a UAS will test, in a controlled setting, airworthiness, autonomous flight capabilities, video acquisition, and anomaly detection.

WHAT IS MARINE DEBRIS?

Marine debris is any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment or the Great Lakes.

MARINE DEBRIS SOURCES

Sources of marine debris include land-based sources, such as littering, dumping, and industrial losses. Ocean-based debris can come from fishing vessels, cargo ships, stationary platforms, and other vessels.

MANDATES

Mandates supporting NOAA's marine debris efforts include the following:

- Marine Debris Research, Prevention, and Reduction Act of 2006, 33 U.S.C. §§ 1951 et seq.
- U.S. Ocean Action Plan
- Coral Reef Conservation Act
- Marine Plastic Pollution Research and Control Act, 33 U.S.C. §§ 1901 et seq.
- Marine Protection, Research, and Sanctuaries Act, (Title II) 33 U.S.C. §§ 1401 et seq.
- Clean Water Act, 33 U.S.C. §§ 1251 et seq.

CURRENT PARTNERS

- NOAA, PIFSC, Coral Reef Ecosystem Division
- Airborne Technologies, Inc.

BENEFITS OF THE PROJECT

- Development of an action plan through government and private sector expertise to research, develop, and test technologies and protocols to ultimately detect and remove DFG from the pelagic environment before it reaches sensitive nearshore environments.
- Identification and synthesis of existing information on the behavior and movement of marine debris in the North Pacific; appropriate sensor, UAS, and anomaly detection technologies; and the activities that have been undertaken to date to detect and track derelict fishing gear.
- UAS test flights will demonstrate current capabilities of ship-based autonomous flight and survey patterns, anomaly detection of prepositioned DFG targets, and airframe robustness after repeated launches and recoveries in order to better evaluate this technology for at-sea detection of DFG.

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Launching the prototype Resolution airframe (Airborne Technologies Inc.) during initial UAS test flights in the nearshore waters of Oahu, Hawaii, December 2007. *Photo courtesy of NOAA.*

This project is funded through NOAA's National Ocean Service, Office of Response & Restoration, Marine Debris Program. The NOAA Marine Debris Program works with other NOAA offices, as well as other federal, state, and local agencies and private sector partners to support national, state, local and international efforts to protect and conserve our nation's natural resources, oceans, and coastal waterways from the impacts of marine debris.